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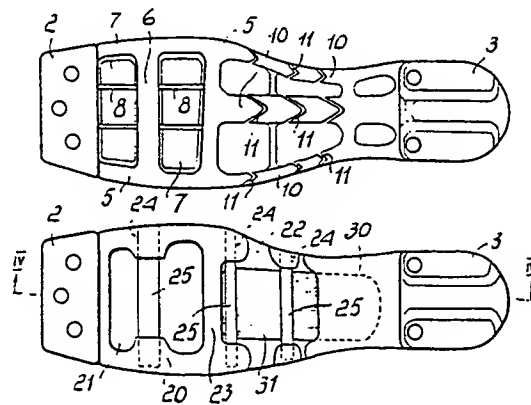
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(54) Reinforcing sole for footwear, in particular long-distance skiing footwear.

(57) A reinforcing sole for long-distance skiing footwear, which comprises stiffening means (4) elastically flexible in the longitudinal direction, and substantially rigid in the transverse direction. The stiffening means comprise among others ribs (4) crossing one another substantially perpendicularly and being arranged mutually inclined on the longitudinal centerline of the sole (1). The ribs (4) have reduced resisting sections at the crossing points thereof.



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TITLE

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This invention relates to a reinforcing sole for footwear, in particular long-distance skiing footwear.

5 It is well known that the practice of sport activities, specifically long-distance skiing, requires footwear that exhibit flexibility characteristics in one direction and rigidity or stiffness characteristics in another direction.

10 Considering, in particular, long-distance skiing footwear, it is noticeable that it must be considerable light in weight, while adequately protecting the foot against water and snow leaks, and leave the ankle articulation almost completely unimpeded, or at least only slightly restrained.

15 In long-distance skiing footwear, it is further necessary for the sole to incorporate latching means for an efficient coupling of the footwear to the ski bindings.

20 The solutions provided heretofore have not always been successful, especially in providing a sole having good longitudinal flexibility at the plantar region, i.e. in respect of deformations of said sole which result from relative turning about an axis substantially perpendicular to the
25 longitudinal extension of the footwear plantar region and substantially parallel to the ground, while having a certain transverse rigidity, namely about an axis extending perpendicularly to the former.

This invention sets out to solve the above

problem by providing a reinforcing sole for footwear, which affords the possibility of adjusting, in accordance with contingent requirements, the degree of flexibility and, respectively, rigidity
5 of the footwear, to thus confer to the footwear all those mechanical characteristics which best suit a selected sport activity.

Within the above general aim, it can be arranged that the reinforcing sole according to
10 this invention, while exhibiting greatly improved features, is also simple to manufacture without involving any expensive or complex equipment.

It can be further arranged that the reinforcing sole of this invention can be readily formed from
15 elements and materials which are ordinarily available on the market, and is highly competitive from the economical standpoint.

According to one aspect of the present invention, there is provided a reinforcing sole
20 for footwear, in particular long-distance skiing footwear, characterized in that it comprises stiffening means elastically flexible in the longitudinal direction, that is in respect of deformations of said sole resulting from relative
25 rotation about an axis substantially perpendicular to the longitudinal extension of the footwear plantar region and substantially parallel to the ground, and substantially rigid in the transverse direction, that is in respect of deformations of
30 said sole resulting from relative rotation about

an axis extending substantially parallel to the longitudinal extension of the plantar region of said footwear.

Further features and advantages will be
5 apparent from a detailed description of some preferred, but not limitative, embodiments of a reinforcing sole for footwear, in particular long-distance skiing footwear, with reference to the accompanying exemplary drawing, where:

10 Figure 1 is a bottom plan view of a first embodiment of the sole;

Figure 2 is a bottom plan view of a second embodiment of the sole, as incorporating preset resisting sections;

15 Figure 3 shows a third embodiment of the sole, with interchangeable elements; and

Figure 4 is a sectional view taken along the line IV-IV of Figure 1.

With reference to the drawing figures, and
20 specifically to Figure 1, the reinforcing sole for footwear, in particular long-distance skiing footwear, according to this invention, is indicated generally at 1 and has a toe bit 2 at the front, and a heel bit 3 at the rear, which are of
25 conventional design for connection to the footwear and possibly to the ski bindings.

At that portion of the sole which spans the plant and arch of the foot, the exposed side of the sole 1 has stiffening means which comprise a
30 plurality of ribs 4 intersecting one another in a

substantially perpendicular fashion and arranged to be mutually inclined in one direction and in the opposite direction with respect to the longitudinal centerline of the sole.

5 The ribs 4, which have reduced resisting sections at their crossing points, afford the possibility of imparting elastic flexibility in a longitudinal direction, that is in respect of deformations of the sole 1 resulting from relative rotation about an
10 axis extending substantially perpendicular to the longitudinal lay of the plant region of the footwear and substantially parallel to the ground, while affording good rigidity in a transverse direction, that is in respect of deformations of the sole
15 resulting from relative rotation about an axis substantially parallel to the longitudinal lay or extension of the footwear plantar region.

 The embodiment illustrated in Figure 1, wherein transverse stiffness is practically ensured by the
20 honeycomb structure of the ribs, lends itself ideally to direct incorporation in the sport shoe sole, to thus confer thereto the aforementioned features; this solution affording variation of the rigidity and flexibility characteristics by utilizing the
25 different mechanical properties of the materials employed.

 With reference to Figure 2, the reinforcing sole has stiffening means comprising a peripheral border
5 connected, at the foot plant, by transverse ribs
30 6 which define reduced cross-section recesses 7

which may include longitudinal ribs 8 interconnecting opposite transverse edges of the recesses 7.

5 This solution, by virtue of the larger cross-section of the transverse ribs 6 with respect to the ribs 8 imparts, at the plantar region, a great transverse rigidity combined with a longitudinal flexibility which can be adjusted and set by suitably dimensioning the border 5 as well as the transverse ribs 8.

10 At the arched region of the foot, there are defined longitudinal ribbings 10 which are interrupted by cutouts 11, which by breaking the continuity of the cross-section of the ribbings 10, impart the desired flexibility in the longitudinal
15 direction.

The cutouts 11 may have a herring-bone or dovetail configuration, or any other configuration effective to ensure a good flexibility in the longitudinal direction together with considerable
20 rigidity or stiffness in the transverse direction.

It should be added that by providing the cutout, an elastic element is effectively achieved which favor the return of the sole to its rest position.

25 With reference to the embodiment shown in Figures 3 and 4, a sole, similar in principle to the preceding ones, will be described with the difference that it includes stiffening means which are interchangeable in accordance with contingent
30 requirements.

More specifically, the sole has a bordering edge or border 20 which defines a first window 21 at the foot plantar region and a second window 22 at the arched region, said first and second windows
5 being separated from each other by a transverse embossment 23 effective to impart a certain rigidity in the transverse direction.

To adjust as desired the transverse rigidity and longitudinal flexibility, at the first window 21
10 there are provided sleeve-like seats 24, whereinto a transverse stiffening foil 25 can be inserted from one side of the sole. Similar sleeve seats 24 are provided, for lateral access, at the arched region of the foot, where a pocket-like seat 30 is defined
15 wherein a prevaillingly longitudinally extending elastic foil 31 can be inserted which imparts the desired elastic flexibility in the longitudinal direction, to allow an elastic recover of the sole which can be adjusted by changing the type of the
20 elastic foil utilized.

With this embodiment, therefore, the user is enabled to adjust at will, in accordance with the requirements of the intended sport practice, the stiffening foils 25, as well as the elastic foil 31,
25 to thus achieve the mechanical characteristics of the sole which best suit the user's own requirements.

Thus, it will be appreciated from the foregoing that the invention achieves its objects, and in particular the fact is pointed out that this sole

affords the possibility of manufacturing footwear of a lightweight type the only function whereof is one of protecting the foot, whereas the mechanical properties required of the footwear are in practice
5 delegated to the reinforcing sole of this invention, which sole can provide all those mechanical characteristics which are sought by the user in practicing a sporting activity.

The invention as described is susceptible to
10 many modifications and variations without departing from the purview of the instant inventive concept.

Moreover, all of the details may be replaced with other, technically equivalent, elements.

In practicing the invention, the materials
15 employed, as well as the dimensions and contingent shapes, may be any ones to suit individual applicational requirements.

CLAIMS

1 1. A reinforcing sole for footwear, in particular
2 long-distance skiing footwear, characterized in that
3 it comprises stiffening means (4,5,6,10,20,25,31)
4 elastically flexible in the longitudinal direction,
5 that is in respect of deformations of said sole (1)
6 resulting from relative rotation about an axis
7 substantially perpendicular to the longitudinal
8 extension of the footwear plantar region and
9 substantially parallel to the ground, and substantial-
10 ly rigid in the transverse direction, that is in
11 respect of deformations of said sole resulting from
12 relative rotation about an axis extending substantial-
13 ly parallel to the longitudinal extension of the
14 plantar region of said footwear.

1 2.. A reinforcing sole according to Claim 1,
2 characterized in that said stiffening means comprise
3 ribs (4) crossing one another substantially
4 perpendicularly and being arranged mutually inclined
5 on the longitudinal centerline of said sole (1),
6 said ribs (4) having reduced resisting sections at
7 the crossing points thereof.

1 3. A reinforcing sole according to the preceding
2 claims, characterized in that said stiffening means
3 comprise a peripheral border (5) extending along the
4 periphery of the foot plantar region, said border
5 being connected by transverse ribbings (6) defining
6 recesses (7) the opposite transverse edges whereof
7 are interconnected by longitudinal ribbings (8).

1 4. A reinforcing sole according to one or more

2 of the preceding claims, characterized in that it
3 comprises longitudinal ribbings (10) arranged at
4 the arched region of the foot and having cutouts
5 (11) defining a sharp cross-section change.

1 5. A reinforcing sole according to one or more
2 of the preceding claims, characterized in that
3 said cutouts (11) have a herring-bone and/or
4 dovetail configuration.

1 6. A reinforcing sole according to one or more
2 of the preceding claims, characterized in that said
3 stiffening means comprise a contouring border (20)
4 connected by a transverse embossment (23) defining
5 a first window (21) at the foot plantar region and
6 a second window (22) at the foot arched region.

1 7. A reinforcing sole according to one or more
2 of the preceding claims, characterized in that
3 it comprises at said border (20) sleeve-like seats
4 whereinto interchangeable stiffening foils (25)
5 can be inserted.

1 8. A reinforcing sole according to one or more
2 of the preceding claims; characterized in that it
3 comprises, at the region corresponding to the foot
4 arched region, a pocket-like seat whereinto an
5 elastic foil (31) can be inserted which has a
6 prevailingly longitudinal extension and is adapted
7 to impart a degree of elasticity for returning said
8 sole to the rest condition thereof.

1 9. A reinforcing sole according to one or more
2 of the preceding claims, characterized in that said
3 sole (1) is formed directly at the footwear sole

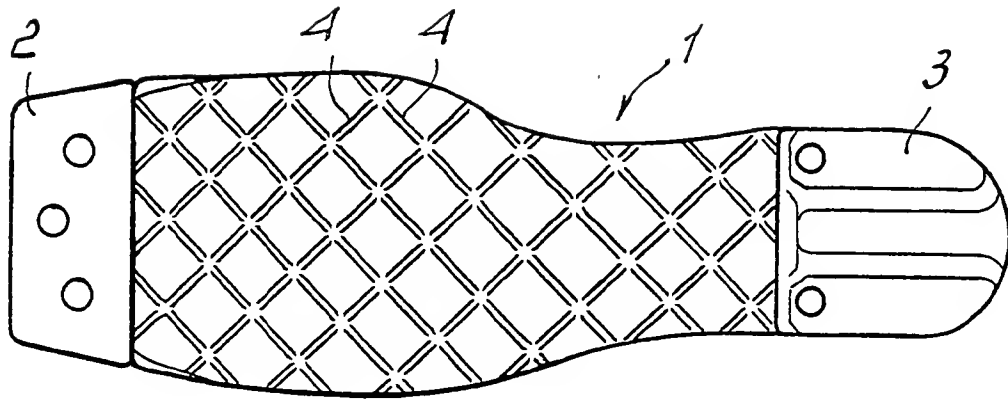


Fig. 1

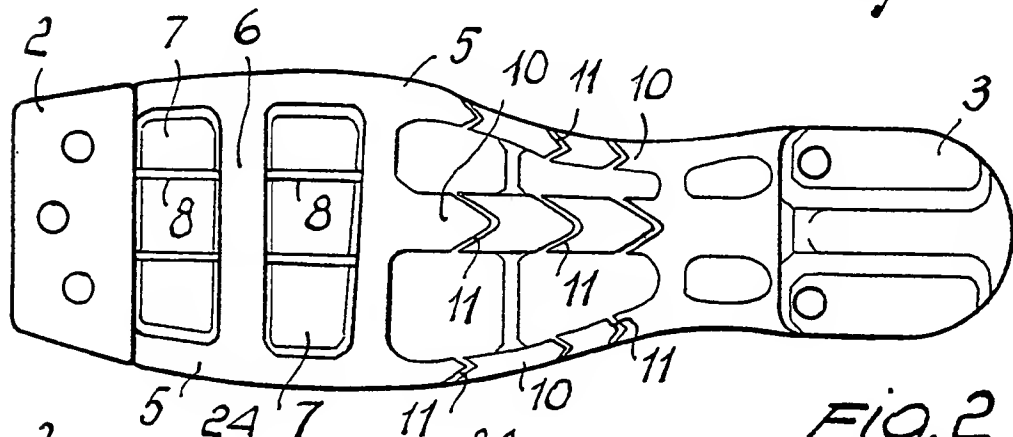


Fig. 2

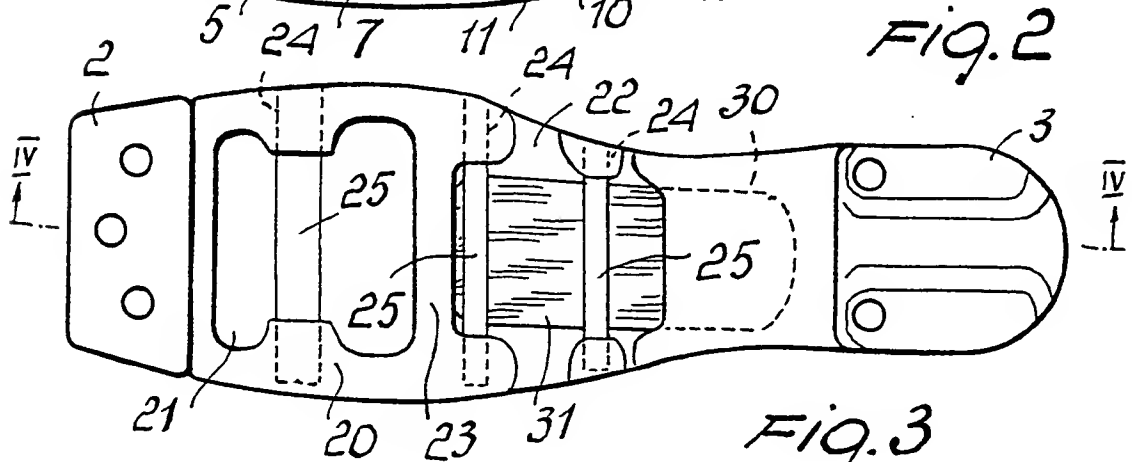


Fig. 3

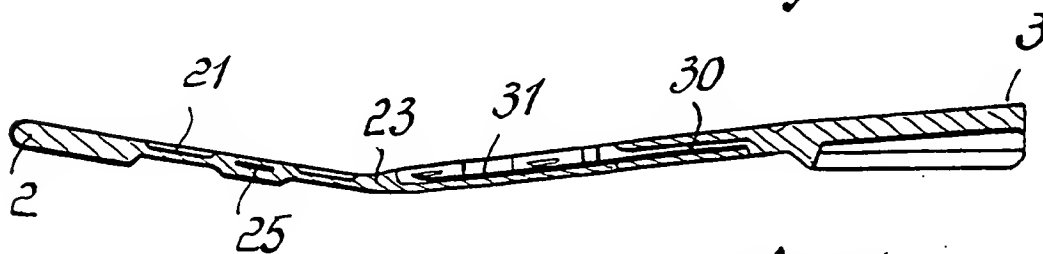


Fig. 4



European Patent
Office

EUROPEAN SEARCH REPORT

0029206

Application number

EP 80 10 6969

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>DE - A - 2 657 099</u> (A. DASSLER)	1	A 43 B 5/04 13/14
A	<u>DE - A - 2 645 007</u> (CONT. GUMMI)	1	
A	<u>FR - A - 2 179 463</u> (A. DASSLER) & US - A - 3 808 713 -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
			A 43 B
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
<input checked="" type="checkbox"/> The present search report has been drawn up for all claims			& member of the same patent family, corresponding document
Place of search The Hague		Date of completion of the search 02-02-1981	Examiner DECLERCK

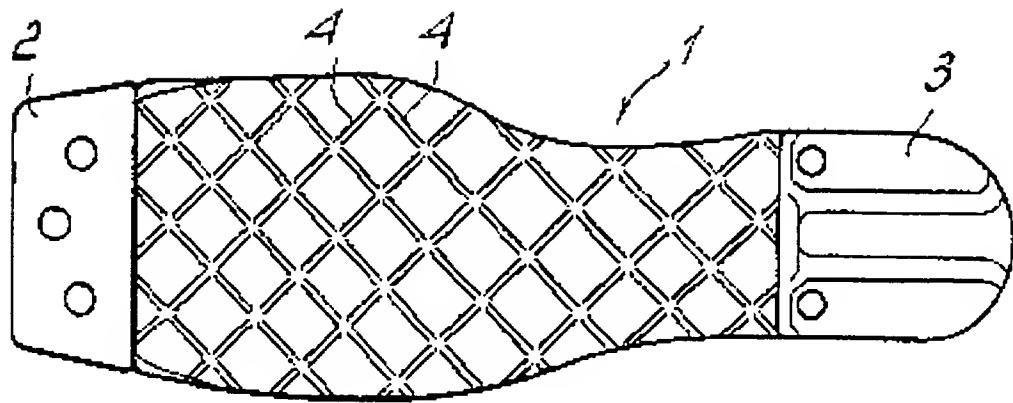


Fig. 1

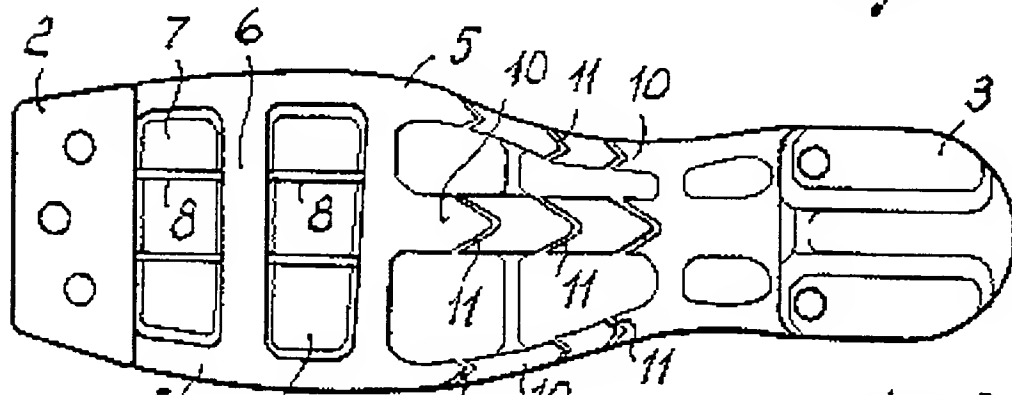


Fig. 2

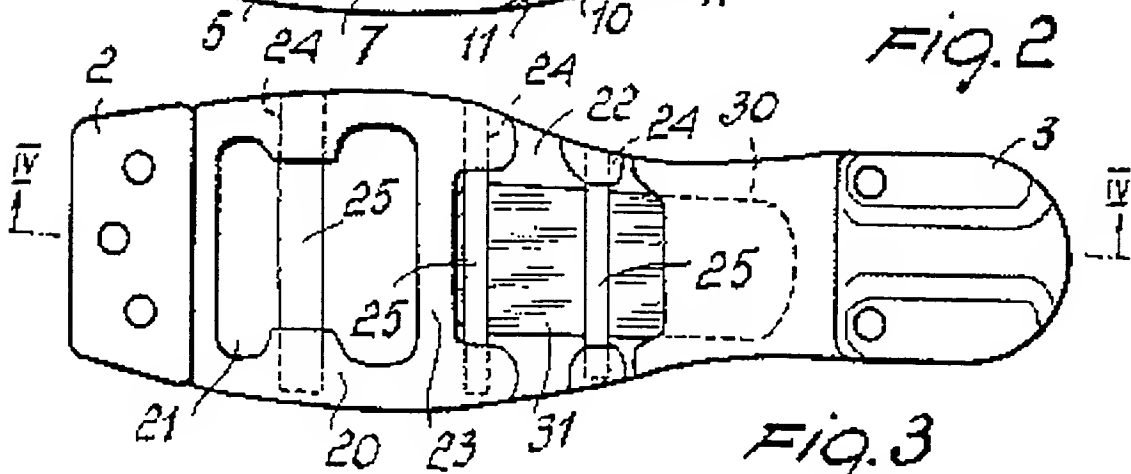


Fig. 3

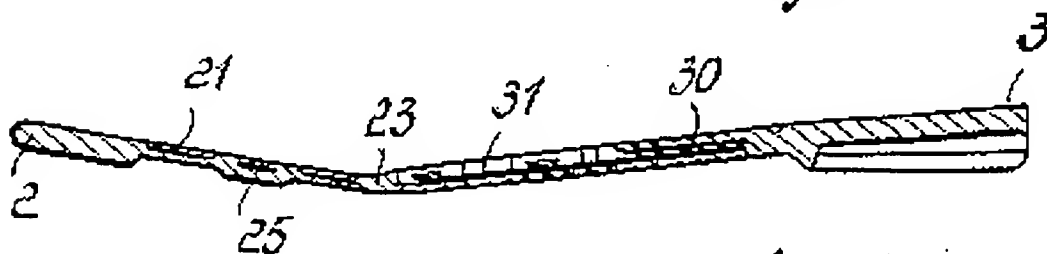


Fig. 4

4 area.

1 10. A reinforcing sole according to one or more
2 of the preceding claims, characterized in that said
3 sole (1) is attached to the sole area of said
4 footwear.